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ON TOP OF NEW ENGLAND (*Photo by Eric M. Sanford, courtesy of New Hampshire State Planning and Development Commission*)

Employment in New England

Part II—Effects of Employment Changes

Manufacturing employment in New England between 1947 and 1953 shifted to industries where workers create a greater amount of value per hour of work. This represents an improvement in the utilization of New England's labor force. High value-added industries usually employ a higher percentage of skilled workers in their operations and pay higher wages.

In New England the gain in output per man-hour exceeded comparable gains in the nation in most of the industries which registered the greatest man-hour output gains between 1947 and 1953. This suggests that the region has improved its competitive position in these growing industries.

The increased importance of durable-goods manufacturing in New England may make employment less stable. But hard-goods industries tend to recover more rapidly than soft-goods industries after recessions and have shown stronger long-term growth trends. New England should strive to retain its nondurable-goods industries. They will help provide employment stability.

MOST OF the gains in employment in New England between 1947 and 1953 occurred in nonmanufacturing occupations. (See "Employment in New England," Part I, in the January 1954, *Monthly Review*.) This development poses a challenge to New England to make the most effective use of its labor force. As incomes rise and as economies become more industrialized, larger shares of the labor force tend to be devoted to trade and service occupations. But most jobs in distribution and service occupations depend upon more basic sources of income. Manufacturing is the major basic source of payrolls in New England and continued growth in manufacturing income is essential. Because it is no longer possible to transfer large portions of the labor force from farms to factories in the region, changes within the manufacturing sector of the economy become of critical importance in determining income levels in the region. This article examines the implications of changes that have taken place in New England's manufacturing structure since 1947.

New England remains one of the most highly industrialized regions of the country. The region's manufacturers created nearly nine billion dollars of new values in 1952.[1] This represents 8.3 per cent of the total value added by manufacture in the nation and compares favorably with the region's 6.1 per cent of the country's population.

New England has been predominantly a producer of nondurable goods in the past, but in 1952 the durable-goods industries took the lead. In 1939, makers of durable goods contributed only 39 per cent of the total value added by manufacture in New England. In 1947 they produced 42 per cent and in 1952 they increased their importance to 52 per cent of the total. A previous article pointed out that durable-goods manufacturers made the largest gains in employment in New England between 1947 and 1953. The accompanying table shows changes in value added by manufacture in New England industries between 1947 and 1952. Durable-goods industries accounted for 85 per cent of the increase in New England, and nearly all of this occurred in metal-working industries.

The increasing relative importance of hard-goods manufacturing in New England has been caused not only by the rapid growth of durable-goods industries but also by a decline in textiles output and relatively small gains in other soft-goods industries. Value added by manufacture in the hard-goods sector increased more than twice as fast as in the soft-goods industries nationally between 1947 and 1952. New England matched the 65 per cent gain of the nation in value added by durable-goods manufacturers, and four of the nine major

[1] See Technical Footnote on page 2.

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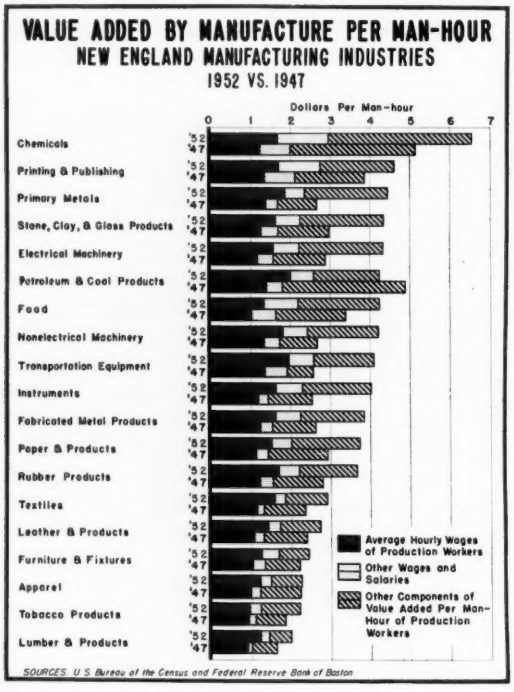


groups of durable-goods industries expanded more rapidly in New England than in the United States. This was true even though the region already accounted for substantial amounts of national output in these industries in 1947. The value added by soft-goods industries increased only eight per cent in New England, however, compared to a 28 per cent national gain. Furthermore, every one of the eleven nondurable-goods industries except shoes and leather showed a smaller increase in New England than it did in the country as a whole.

Changes between 1947 and 1952 resulted in the nonelectrical machinery industry displacing textiles as the leading New England industry in terms of value added by manufacture. The electrical machinery industry moved from the fifth to the third most important industry, and the rapid gain in output of transportation equipment caused this industry to jump from thirteenth to fifth place. Producers of fabricated metal products declined in relative importance from third to fourth place. Rapid increases in output in primary metals plants caused this industry to become the sixth most important one in New England in terms of value added by manufacture in 1952. It ranked eighth in 1947. A smaller-than-average increase in the leather industry resulted in this category falling from fourth to seventh place in terms of value added.

Value Added per Man-Hour

Does the employment shift between industries in New England result in better or poorer utilization of the region's factory workers? In considering this question, it is helpful to examine the value added per man-hour of labor in the various industries.

An accompanying chart shows value added per man-hour in the major industry groups in New England in 1947 and in 1952. A man-hour is one hour of work by a production worker either on regular time or overtime. The chart depicts the ratio of output, as measured by value created by manufacture, to input in terms of man-hours. This is a rough measure of the combined productivity of the many factors of production in an industry. The first two areas in each bar of the chart represent wages for production and related workers and salaries and wages for officers, administrative, technical, sales, and office personnel. The striped areas represent the differential or balance of value added per unit of work, which is available for all other operating expenses, capital expenditures, and profits. It is apparent that production workers in the industries near the top of the chart create a greater dollar amount of output in one hour of work than workers in industries near the lower end of the chart.

A large number of factors influence value added by manufacture per man-hour in various industries. Plant layout, quantity and quality of machinery available, continuity of operations, marketing arrangements, wage and salary rates, worker skills and attitudes, working conditions, management methods and effectiveness, and several other forces may cause the ratio to vary from industry to industry. For example, general demand and supply conditions in the period from 1947 to 1952 tended to favor metalworking industries more than soft-goods industries. This led to higher profit margins in the metalworking industries during the period.

Differing amounts of machinery and equipment available to production workers in various industry groups has a great effect on the amount of value that will be created in an hour of work. Other factors being equal, output per man-hour will be greater in industries where each worker has at his command a large amount of machinery and materials-handling equipment than in industries where much of the work must be done by hand. In 1952, investment in property, plant, and equipment per production worker in the United States varied from $11,400 in the chemical industry to $380 in the apparel industry, although many concerns in the apparel and other industries near the bottom of the chart operate in rented space and lease most of their machinery. Four of the top six industries in the chart had an investment per production worker exceeding $4,700. Three of the five industries at the bottom of the chart had an investment per worker of less than $1,500.

Management and worker attitudes and methods may also account for some of the differences from industry to industry in output per man-hour. The age and efficiency of plant and machinery available to workers also affects their output. In the past few years, the

TECHNICAL FOOTNOTE

Data showing value added by manufacture provide one measure of the way in which New England is using its labor force. Value added by manufacture by a plant or industry excludes costs of all purchased materials, supplies, containers, fuel, electric energy, and contract work. It includes wages and salaries for direct and indirect labor and management, depreciation and depletion charges, expenses for such items as taxes, insurance, rent, maintenance, research, pensions, selling and advertising activities, and profits. Although some of these items do not actually represent value added by manufacture, the measure approximates the increase in value given to raw and semi-finished materials by the process of manufacture. Value added by manufacture provides the most satisfactory measure of the relative economic importance of manufacturing in different industries and different areas, according to the Census Bureau.

industries toward the top of the chart have generally spent more for new plant and equipment, in relation to their total investment in these items, than have the industries toward the lower end of the chart. In 1952, the rate of investment in new plant and equipment in the transportation equipment, chemical, and publishing industries was double that of the textile and leather industries.

Varying wage and salary payments per man-hour explain some of the differences between industries shown in the chart. Both hourly wages of production workers and salary payments of office, technical, and sales personnel per man-hour are generally higher in the industries near the top of the chart than in those closer to the bottom. A larger proportion of administrative, sales, and technical employees in the upper industries, as well as higher salary payments, account for the differences shown in salary payments per man-hour.

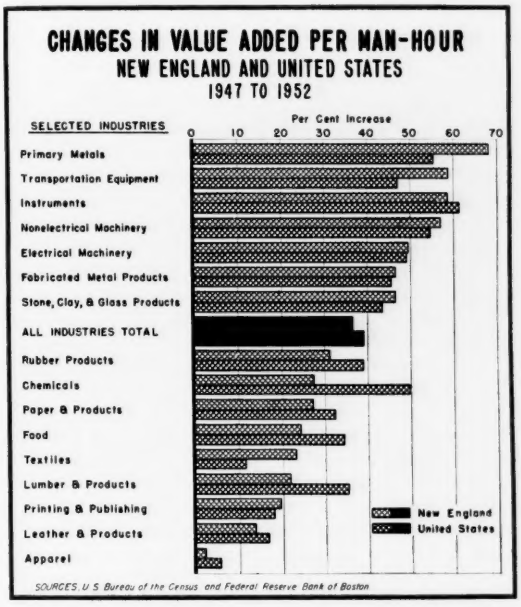
Different profit margins from industry to industry provide still another reason for differences among industries in output per man-hour because profit is one of the components of value added. Industries in the upper part of the chart tend to have higher profit margins than industries toward the bottom. For example, in the period from 1947 to 1952, profits before taxes averaged over 11.5 per cent of sales in five out of the top six industries in the chart. Profits were less than eight per cent of sales in three of the five lowest industries.

To summarize, a combination and interaction of several factors explain the differences from industry to industry in value added per man-hour shown in the chart. We have outlined how the major forces leading to variations operate. The result of these forces is that workers in the industries toward the top of the first chart produce a greater amount of value per man-hour than those employed in industries toward the lower end of the chart.

Changes in Value Added per Man-Hour

The second chart depicts changes in value added per man-hour in New England's leading industries compared with changes in the United States between 1947 and 1952. It shows that the industries which made the greatest gains in New England were generally those which already had a relatively high output per man-hour in 1947. Six of the seven industries which registered the largest increases from 1947 to 1952 ranked in the upper half of the first chart. Of even greater importance, all except one of the seven industries which made the largest gains in New England increased their output per man-hour in the region at a more rapid rate than they did in the country as a whole. Part of this greater increase in New England may have been due to a relatively lower 1947 output per man-hour in most of these industries in New England than in the United States. But in no industry did the difference exceed 13 per cent, and it averaged less than eight per cent.

The interaction of a large number of factors accounts for the changes in output per man-hour shown in the chart. Differences in product specialization, changes in demand and prices for various products, new management and labor techniques, improvements in plant and equipment, and many other forces combine to change value added per man-hour. It is impossible to determine



how much each of the forces involved affected the ratios. But this does not make the measures of changes in output per man-hour useless. If output per man-hour in New England is increasing more rapidly in some industries than in the country as a whole, it indicates that the factors involved are operating to improve the region's over-all efficiency in these industries more rapidly than in the nation.

The textile industry was the only relatively low-ranked industry in terms of output per man-hour in which New England showed a greater increase than the United States average. New England's relatively heavy concentration on woolen and worsted products provides part of the explanation. The more rapid rise in wool prices helped increase value added per man-hour more rapidly in woolen than in cotton goods. Another probable cause was that contraction in New England's textile industry was concentrated in firms with low value added per man-hour.

Effects of Changes

What have been the effects of the changes in manufacturing employment discussed in the January *Monthly Review* and the shifts in output outlined above? Have they tended to strengthen or impair New England's competitive position and the use of its labor force? What problems and opportunities may emerge from these shifts?

As a result of changes since 1947, New England in 1953 had a smaller percentage of its workers in industries with relatively low output per man-hour and a larger percentage in more highly mechanized industries with high output. This represents an improvement in the use of New England's labor force. The high-value-added industries generally call for a higher level of labor skills and pay higher wages. They are industries in which it appears that New England can continue to have many comparative advantages and in which the

prospects for long-term growth appear to be good.

The top seven industries in the second chart, together with the miscellaneous manufacturing category, which also increased output per man-hour more rapidly than all industries in New England between 1947 and 1952, employed 45 per cent of all manufacturing workers in the region in 1947 and 50 per cent in 1953. New England's industrial future will probably depend to a great extent upon the importance of these industries in the national economy and upon New England's competitive position in these industries. The greater-than-average gain in output per man-hour in New England in six out of eight of these industries is encouraging evidence that New England has improved its competitive position in these industries.

Shift to Industries Which Generally Pay Higher Wages

In addition to shifting New England's labor force to industries which make more productive use of labor, the changes in employment and output which occurred since 1947 tended to raise the income of manufacturing workers. High value-added industries are usually high-wage industries, as shown by the average wage components of the first chart.

Average hourly earnings in 1952 in six of the seven industries which showed the greatest gains in output per man-hour exceeded average hourly earnings in all industries in New England and in the textile industry, where most of the employment decline occurred in New England between 1947 and 1953. This would indicate that New England's labor force is receiving a higher income as employment becomes more concentrated in durable-goods industries and less concentrated in textiles.

This does not necessarily mean that the individual workers who have lost jobs in textile plants have found higher-paying jobs in other industries. Although some workers in declining industries have transferred to expanding industries, the transitional problem is still great. Many former textile workers have found that their skills are no longer in demand in their communities and they have taken lower paying jobs. The growing, high-wage industries have probably drawn their workers from new entrants to the labor force and from persons voluntarily transferring from other jobs to a greater extent than they have drawn upon unemployed textile workers. The over-all result of the shift from textile to metalworking employment, however, has been to raise income of workers in New England.

Average hourly earnings in the electrical machinery industry in New England, which is one of the fastest growing industries, were still slightly below the average for all industries and for the textile industry in 1952. The youth of this industry may partially account for its comparatively low wage rates. New industries generally pay relatively low wages in their infancy. Most firms in this industry are relatively young and a large number of new concerns have been established in New England since 1947.

Manufacturing activity in New England since 1947 has also tended to shift from industries where wage rates in the region are above the national average to industries where regional wage rates are below the industry average for the country. This change has tended to improve the competitive position of New England manufacturers. Hourly wages for production workers in the textile and leather industries in New England exceeded those in the country as a whole in both 1947 and 1952, and the differential increased in this period. Both of these industries showed declines in employment between 1947 and 1952. Hourly wages in each of the seven top-ranked industries in the second chart, however, were lower in New England than in the United States. This is important because these are the industries in which the growth potential in New England is greatest and which generally pay higher-than-regional-average wages. The differential between regional and national average wages narrowed between 1947 and 1952 in two of these industries but widened in the other five. Less tightness in New England's labor markets in the 1947-1952 period probably accounted for much of this.

The apparel and furniture and fixtures industries also expanded employment in New England quite rapidly between 1947 and 1952. These industries, however, cannot be expected to contribute materially to the future growth of manufacturing in the region. Neither are high-value-added or high-wage industries. While their growth in the region has served to furnish employment in some areas where there were large numbers of unemployed workers, New England would improve the use of its labor force and its income position if it concentrated on obtaining new concerns or helping existing firms expand in the higher-value-added, higher-wage industries. Many apparel and furniture firms established operations in New England principally because they require large amounts of low-cost labor and were attracted by the large pools of unemployed workers in certain parts of New England. These workers would have enjoyed higher incomes, however, if job opportunities had been available in higher-wage industries.

Another advantage for New England of the trends in manufacturing output and employment in recent years is that the expanding industries generally have a larger differential between total value added and wages and salaries and also have higher profit margins than the declining industries. This leaves the expanding industries with larger amounts for replacement and modernization of plant and equipment, for taxes, and for research, marketing, maintenance, and other expenses.

The fact that the expanding industries in New England are those that have generally expanded most rapidly in the nation is also encouraging for New England's industrial future. In the past New England has relied on industries which were declining or growing at a very slow rate. New England can probably expect further contraction in industries where output per man-hour is low, where regional wages are higher than those in other parts of the country, and which are not growing on a national scale. To provide work for persons who lose jobs in declining industries and for new entrants to the labor force, it is especially important that New England encourage the establishment and growth of the expanding high-value-added industries.

Some Problems May Be Intensified

Changes in New England's industrial structure since 1947 may lead to some problems as well as opportunities. The increased importance of the durable-goods indus-

tries may tend to make employment in the region less stable. Heavy dependence on defense contracts may cause difficulties in some lines if military expenditures are reduced substantially.

Demand for soft goods is generally more stable than demand for hard goods. Employment in durable-goods manufacturing is typically subject to wider swings than employment in nondurable-goods industries. In addition, employment and unemployment cycles in the hard-goods industries tend to be of longer duration. Therefore, if unemployment should spread throughout the durable-goods industries, the impact upon the economy of New England may be greater in the future than that caused by more frequent but less drastic recessions in nondurable-goods industries.

In the period between the two World Wars, manufacturing employment in New England did not fall as much during recessions and depressions as it did in the nation, and it did not rise as rapidly during periods of expanding business activity.[2] New England was much more dependent on nondurable-goods industries than the nation as a whole in that period. Within New England, fluctuations of employment and unemployment were less in the nondurable-goods industries than in the durable-goods sector. Connecticut depended more heavily upon durable-goods industries than any other state in the region, and it had the greatest variations in employment. But it was also the most prosperous of the six New England states.

[2]See "Trends in New England's Factory Employment," *Monthly Review*, April 1947.

Between 1939 and 1947, there was a more rapid shift of employment concentration from the soft to the hard-goods industries in New England than in the country as a whole. This trend has continued since 1947, even though New England still relies more heavily on nondurable-goods industries than the nation does. As employment in durable-goods industries increases in relative importance, New England is likely to experience greater sensitivity to short-term fluctuations in employment and unemployment. Even though recessions and depressions may hurt the region more, however, the upturns are likely to proceed more rapidly if New England is more heavily dependent on durables than it was before World War II.

During the recession of 1948-1949, employment fell off almost twice as much in durable-goods industries as in soft-goods industries in New England, and the length of the downward trend in hard-goods industries exceeded that in the nondurable-goods sector. Employment in durable-goods manufacturing plants in New England began to decline after February 1947. By July 1949, these industries had decreased their work forces by almost one-fourth. From the peak in December 1947, to the trough in May 1949, employment in nondurable-goods industries fell 12.8 per cent. But when recovery began in the latter part of 1949, it proceeded more rapidly in the durable-goods industries than in the nondurables. In June 1953, hard-goods manufacturing employment exceeded the July 1949 low point by 44.2 per cent. But the peak employment in nondurable-goods industries in New England, reached in March 1953,

MANUFACTURING IN NEW ENGLAND, 1947–1952

Industry	Value Added By Manufacture (millions of dollars)			Production Workers (thousands employed)			Man-hours of Production Workers (millions)		
	Amount 1952	Change from 1947		Number 1952	Change from 1947		Number 1952	Change from 1947	
		Amount	Per Cent		Number	Per Cent		Number	Per Cent
All Manufacturing	**$8,989.1**	**$ 2,175.3**	**+ 32**	**1,215.0**	**−33.2**	**− 3**	**2,479.0**	**− 95.5**	**− 4**
Nondurable goods	**4,292.7**	**+ 329.5**	**+ 8**	**657.8**	**−69.5**	**−10**	**1,298.5**	**−184.3**	**−12**
Food	424.1	+ 59.4	+ 16	50.6	0	0	100.2	− 7.1	− 7
Tobacco	3.8	− 0.1	− 3	1.1	− 0.2	−15	1.7	− 0.4	−19
Textiles	1,154.0	− 91.6	− 7	201.1	−59.6	−23	396.6	−132.2	−25
Apparel	281.9	+ 1.9	+ 1	67.3	+ 0.4	+ 1	123.4	− 2.1	− 2
Paper	463.7	+ 66.7	+ 17	57.0	− 3.0	− 5	124.3	− 11.1	− 8
Printing	298.3	+ 17.1	+ 6	31.3	− 4.8	−13	64.7	− 8.4	−12
Chemicals	259.0	+ 42.1	+ 19	18.8	− 1.3	− 7	39.5	− 2.7	− 6
Petroleum, Coal	27.1	− 6.7	− 20	3.1	+ 0.1	+ 4	6.4	− 0.5	− 7
Rubber	283.6	+ 60.8	+ 27	37.9	+ 0.4	+ 1	77.1	− 2.3	− 3
Leather	495.2	+ 41.6	+ 9	100.0	+ 1.2	+ 1	181.2	− 7.8	− 4
Miscellaneous*	602.0	+ 138.3	+ 30	89.6	− 2.7	− 3	183.4	− 9.7	− 5
Durable goods	**4,696.4**	**+1,845.8**	**+ 65**	**557.2**	**+36.3**	**+ 7**	**1,180.5**	**+ 88.8**	**+ 8**
Metalworking	4,294.2	+1,742.6	+ 68	485.2	+28.7	+ 6	1,029.7	+ 78.4	+ 8
Primary Metals	506.0	+ 217.8	+ 76	54.3	+ 1.4	+ 3	113.5	+ 4.9	+ 5
Fabricated Metals	660.3	+ 154.1	+ 30	83.1	− 8.8	−10	172.1	− 21.1	−11
Nonelectrical Machinery	1,520.0	+ 586.9	+ 63	164.4	+ 0.3	0	361.2	+ 13.4	+ 4
Electrical Machinery	831.4	+ 380.1	+ 84	93.8	+16.5	+21	192.6	+ 36.3	+23
Transportation Equipment	548.7	+ 341.7	+165	62.5	+23.5	+60	133.8	+ 53.6	+67
Instruments	227.8	+ 62.0	+ 37	27.1	− 4.2	−13	56.5	− 8.7	−13
Nonmetallic durable goods	402.2	+ 103.2	+ 35	72.0	+ 7.6	+12	150.8	+ 10.4	+ 7
Lumber	139.8	+ 23.9	+ 21	34.3	+ 3.0	+10	69.9	− 0.6	− 1
Furniture and Fixtures	114.4	+ 39.8	+ 53	21.5	+ 5.9	+38	46.8	+ 13.2	+39
Stone, Clay and Glass Prods.	148.0	+ 39.5	+ 36	16.2	− 1.3	− 7	34.1	− 2.2	− 6
All Manufacturing — By States									
Massachusetts	4,270.7	+ 900.6	+ 27	557.2	−44.4	− 7	1,123.7	−105.0	− 9
Connecticut	2,790.9	+ 894.4	+ 47	341.8	+10.3	+ 4	714.5	+ 21.6	+ 3
Rhode Island	724.4	+ 66.0	+ 10	110.0	−18.1	−14	227.0	− 34.5	−13
Maine	525.5	+ 93.4	+ 22	96.2	+ 5.8	+ 6	192.3	+ 2.1	+ 1
New Hampshire	413.2	+ 106.3	+ 35	74.0	+ 7.6	+12	142.0	+ 15.9	+ 4
Vermont	264.2	+ 114.5	+ 76	35.7	+ 5.5	+18	79.5	+ 14.4	+22

*Includes ordnance, jewelry and silverware, and other miscellaneous products.
Source: U. S. Bureau of the Census.

was only 5.9 per cent above the employment level at the bottom of the recession in 1949. Furthermore, the increase in durable-goods employment from the 1949 trough to the 1953 peak in New England exactly matched the increase for the nation. But the gain in the nondurable-goods industries in New England was less than half of the 12.6 per cent average rise registered in the country as a whole.

A study of areas of critical unemployment in New England in 1948-1950[3] showed that one of New England's greatest problems was that many areas were excessively dependent on secularly declining industries, such as textiles, whose accumulated need for adjustment became apparent in the recession. Several areas of large unemployment were heavily concentrated in durable-goods industries, but these areas did not have large labor surpluses so long as did the textile areas. All of the areas which continued to have large amounts of unemployment throughout the recovery in the early part of 1950 before the Korean War were areas in which the textile industry dominated.

The experience of 1948-1950 suggests that it will be to New England's long-term advantage to concentrate more on the manufacture of durables. Even though short-run employment declines in these industries may be greater than in nondurables, the hard-goods industries recover more rapidly and increase employment to a much greater extent after a recession than do soft-goods manufacturers. Greater concentration in the variable but growing hard-goods industries may offset unemployment resulting from past concentration in the less variable but contracting industries. The metalworking industries are the ones that are showing the greatest long-term growth both in the nation and in New England. High levels of employment in peacetime, to which national policy is committed, are favorable to hard-goods industries.

The heavy reliance of some New England industries on defense contracts may also cause problems if military expenditures are cut substantially. Most government contracts have been concentrated in the hard-goods industries. Fortunately, however, New England industry has concentrated much of its defense production in lines such as aircraft, electronics, and atomic-powered submarines which are least likely to be severely cut back in a protracted period of international tension.

The defense program has helped many new firms get started and has speeded the long-term transition of New England's manufacturing industries. At the same time, however, it has obscured some of the underlying weaknesses of the region. Manufacturers who have been aided by defense contracts must seek new and better nondefense products, new technological developments, better production methods, and new civilian markets in order to maintain the gains they have registered since 1950.

Conclusions

In 1947 New England relied greatly on industries of relatively low output per man-hour which have made smaller-than-average gains in output and employment. The region concentrated on nondurable-goods manufacturing during a period when the products of hard-goods industries offered increasing attractions to consumers. To improve its income position, New England must continue to shift to manufacturing industries which add larger amounts of value, which require higher degrees of labor skill and pay higher wages, and it must depend to a smaller extent on the less complex industries, such as textiles and shoes.

New England's industrial future depends greatly on the place metalworking industries occupy in the national economy and upon the region's competitive position in these industries. Most of the rapidly expanding industries in New England have higher profit margins and pay higher wages than the contracting or stationary industries. But wages in these growing industries in New England are below the national average. This and other factors appear to put these industries in a better competitive position in New England than the industries on which the region has been excessively dependent in the past. Increased concentration on high-value-added, high-profit, and high-wage industries has furthered the long-term adjustments in the structure of New England's economy which will be necessary for the continued prosperity of the region.

The rearmament program has greatly stimulated the growth of durable-goods industries in New England. The stability of employment in these industries will depend largely on international developments and on the degree to which production in these industries can be shifted to peacetime products if military expenditures decline. Even in peacetime, the hard-goods industries tend to be more subject to short-term changes in business activity than the nondurable-goods industries. As durable-goods manufacturing increases in relative importance, employment in New England is likely to be less stable. But if consumers continue to spend a larger portion of their incomes on durable goods, as they have since World War II, and if plant and equipment expenditures continue at high levels, the shift to durable-goods industries will be to the long-term advantage of the region. Durable-goods industries have displayed the greatest growth rates in the nation; with the country committed to maintaining high levels of employment, they can be expected to continue their growth.

Nondurable-goods industries have helped make the New England economy more stable than that of the nation in the past. They can be expected to aid in ameliorating cyclical fluctuations in the future. In the last few years competition has weeded out many marginal and inefficient producers in New England. The region cannot, however, expect most soft-goods producers to match the gains of manufacturers of hard goods. Some nondurable-goods industries will probably expand employment, but others, particularly those which are declining throughout the country, will probably continue to offer fewer jobs. New Englanders should make strenuous efforts to keep their soft-goods industries. If the region can retain its nondurable-goods producers, while concentrating on expanding employment in the high-value-added, durable-goods lines, it may enjoy the protection of greater stability of employment in the nondurable-goods industries as well as the greater growth and higher incomes generally associated with the manufacture of durable goods.

[3] *The New England Economy*, a report to the President prepared by a Committee on the New England Economy, Council of Economic Advisers, pp. 39-49.

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FEDERAL RESERVE BANK OF BOSTON

The Impact of Science in the Fishing Industry—II

by DANIEL P. NORMAN[1]

New England will be directly affected by innovations now being introduced in the fishing industry. A preceding article described new electronic devices, which are useful in locating and identifying fish.[2] Other new developments in the fields of textiles, chemistry, refrigeration, and mechanization will have a growing impact and deserve attention. This article highlights some of these developments and considers their importance for the New England fishing industry.

Textile Developments

WHILE ELECTRONIC FISHING is still a promise for the future, the actual catching of fish is already changing rapidly in scope because the nets used to catch fish are undergoing their first major change in history. Here America, particularly New England, leads the world.

Fishermen are continually modifying minor details of mesh size and structure of their nets, but the materials from which the nets are made — cotton, linen, and other vegetable fibers — have remained essentially unchanged since Pharaonic days. It remained for a New England textile firm to develop a process for adapting new man-made fibers for fish nets. The chemical industry had a major share in this development since it was responsible for the production of the basic fibers and the resins which are used to make them suitable for the fisheries use. Yet it took textile know-how to combine these chemical products with the necessary physical processes to produce new fibers which are not only suitable for use in fish nets but are also far superior in many respects to conventional fibers used for this purpose.

The first man-made fibers, the rayons, were unsuited for use as fish nets because their tensile strength, particularly when wet, was much lower than that of the natural fibers. As early as 1939, less than a year after nylon was in commercial production, Gloucester fishermen experimented with nylon nets. Wartime allocations removed nylon from the market, and fishing experiments were suspended until 1945. From 1945 to 1949 nylon in many forms was tried in fishing nets. These trials all showed that nylon, despite its advantages of rot resistance, low weight, and durability, was not suitable as a net material because the net knots would open up with even slight flexing of the net, letting the fish escape. A second fault was that repairs to broken meshes were difficult because the nylon twine frayed into strands at broken or cut ends. Furthermore, rusted metal attacked the nylon chemically, so that the fibers disintegrated rapidly whenever they came in contact with rusted metal fittings on winches, trawl doors, and the like. In attempts to overcome these drawbacks, nylon was twisted into every possible type of twine, and scores of experimental nets were sold and given to fishermen for test purposes, but they were unsuccessful.

In 1948 a New England corporation made a scientific study of the net problem and came up with a process which eliminated nylon's faults while retaining all its virtues. This specially treated and processed nylon is sold under the trade name of Nylock; the other new man-made fibers are similarly processed and treated for use in nets, and are sold under the corresponding trade names of Dalock (for Dacron), Orlock (for Orlon), etc.

The "lock" process consists of applying a resin to the synthetic fiber, stretching the fiber to the point where its residual stretch or elongation is the optimum required for fishing nets, and setting the resin with heat so that it holds the fiber at the desired stretch. The applied resin coating therefore performs the dual function of providing an anti-slip friction coating which enables the fibers to retain knots, and holding the fibers at the proper tension so that they have just the desired degree of stretch and strength. It also minimizes fraying and prevents the destructive action of iron rust.

The fish net industry does upwards of $60 million worth of business per year. A large proportion of the nets are manufactured by a few large, vertically integrated firms. That is to say, these firms are organized to process raw vegetable fibers into finished threads, which, in turn, they make into finished twine and nets. These manufacturers consequently were not enthusiastic about making Nylock nets because it meant cutting back operations in their thread spinning departments and obtaining the processed nylon from an outside supplier.

Gill net fishermen have been so insistent on getting Nylock nets, however, that manufacturers have increased production to meet the growing demand for these nets. Today, fishing boats on the Great Lakes use them almost exclusively.

Nylock gill nets have many specific advantages over those made from natural fibers. Fishermen have found that they need fewer sets of nets per year, fewer replacements and that the nets are easier to handle and the gear needed is lighter. Yet the number of fish caught per net is greater. One further advantage of the Nylock nets over other nets is that the resin treatment of the nylon fibers smooths and cements down the fuzz on the surface of the fibers, thus leaving less area of surface on which phosphorescent organisms may settle. This is an important feature, because on occasion so much phosphorescence gathers on conventional nets that they appear to be on fire, and the fish avoid them easily. This same absence of fuzz may also account, in part, for the greater number of fish caught in Nylock nets. Apparently many fish can sense fuzzy fibers in time to

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[1]The author, Director of Research of the New England Spectrochemical Laboratories in Ipswich, and President of Skinner & Sherman, Inc., Boston, prepared this article under a research grant from the Federal Reserve Bank of Boston. The findings and conclusions are the author's. They are published by this Bank because of their widespread interest to the New England community.

A bibliography on this subject prepared by the author is available from the Federal Reserve Bank of Boston.

[2]*Monthly Review*, December 1953.

back water and escape the meshes of the net; in the absence of fuzz, the fish are caught and held by the net before they can retreat.

Nylock is not restricted to use in gill netting. The first complete, all-Nylock, trawl net is now being towed by a small dragger out of Point Judith, Rhode Island. A trawl net is a big bag net towed along the ocean floor and kept open by a pair of nine-foot wooden "kites" or "trawl doors." The weight and water resistance of a complete trawl is so great that a dragger cannot detect the difference in the power requirement of towing an empty net or one full of fish. Nylock is therefore of value not only because of its intrinsically low weight, but because its cross section, and hence water resistance, is much less than that of vegetable fibers of equal strength. The Point Judith dragger, for example, reports that her maximum tow was formerly a 35-foot cotton trawl. She is now successfully towing a 60-foot Nylock trawl, thereby increasing her fish-catching ability.

New England fishermen can be expected to observe this experiment carefully. Draggers produce the bulk of landings in New England and improvement in trawls could be of immense value. The introduction of Nylock nets is held back, at present, by the belief that possible improvements in catch would be more than offset by the higher price of Nylock netting. Trawl nets are more liable to be torn by obstacles than worn out. To be accepted, the Nylock nets must prove their economy. Results of present experimentation will be critical in determining their expanded use.

Chemical Developments

The Nylock development, which had so favorable an influence on gill-net fishing, was not an unmixed blessing to the net manufacturer. We come now to a comparable example of the almost complete annihilation of one branch of the fishing industry by a chemical development. Briefly, the fish liver oil business was an important phase of commercial fishing operations amounting to over $14 million a year at its peak. Fish liver oils were valued highly because they were one of the principal sources for vitamins A and D. In the thirties it was found that vitamin D could be prepared from other sources. Consequently, the price of fish liver oils was set entirely by their vitamin A content. By 1950 synthetic vitamin A rose from a laboratory curiosity to a successful commercial product, and in its rise destroyed the fish liver oil business. A business which averaged $12.7 million annually from 1941 to 1948 is now down to $2 million per year, with no expectation or hope of ever recovering its vitamin A market. Consequently, the shark liver fishing on the West Coast and, in general, the recovery of livers from fish gutted at sea have come to a nearly complete halt.

Refrigeration

As long as fish were caught only two or three days' distance from port, the practice of packing layers of fish between layers of cracked ice was an effective device for bringing them to market fresh. But as fishermen were gradually forced farther and farther from port by the depletion of many of the nearby fishing grounds, the use of ice became less effective. Today a redfish trawler which catches its fish in northern waters may take several days to return from the fishing grounds. Part of this return trip is made through the warm Gulf Stream waters, with a correspondingly heavy loss of ice, so that it is far from unusual that upon reaching port one to two per cent of the fish are spoiled for use as food. Much of the remainder, while usable and sanitary, can hardly be classed as truly fresh fish, and yields products which do not increase the popularity of fish with the ultimate consumer.

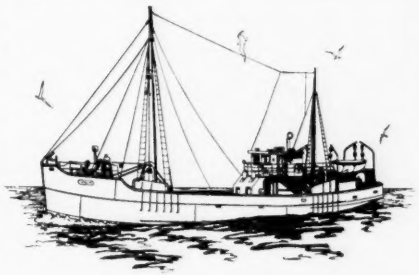
This problem is not a new one. Many ingenious attempts have been made to overcome it. For many years lobsters and eels have been kept alive and fresh by being placed in fenced pounds to which ocean water has free access. The French have long carried this device a step further, developing a type of fishing boat, the *viviers*, in which the hold itself communicates directly with the sea through perforations. The Norwegians have improved upon this by the forced circulation of sea water through the fish holds of modern diesel ships. Despite their low capital cost and relative economy of operation, the live-fish boats have failed to appeal to most operators, primarily, perhaps, because of their intrinsically low capacity. Furthermore, such a method is impractical for customary ground-fish trawling, as a large percentage of the fish are dead or dying when they are brought aboard ship.

Most of the new developments in bringing fresh fish to land have been based on the application of refrigeration equipment. Three broadly separate lines of development can be traced: (1) the use of refrigeration equipment to supplement ice, (2) the freezing at sea of only the edible portion of the fish, usually fillets, on factory ships equipped also to convert all the wastes into by-products, and (3) the freezing of whole fish at sea and their subsequent processing on land. All three lines of development are important; the first because it is in commercial use throughout the world, the second because it is helping solve the European fresh fish problem, and the third because it promises to afford a practical solution to many of the problems of New England's deep-sea fishing industry.

The fishing industry in this country, and particularly its New England branch, was the first segment of the food industry to go in heavily for freezing and the retail sale of frozen products. In the 1920's, a series of four trawlers was built in New England, in which the fish holds had a double wall. In these double walls were installed cooling coils, whose function was to supplement the refrigerating effect and reduce the loss of ice. This refrigerating system was not successful, allegedly because the cooling system was operated improperly. The idea was taken up very widely, however, and before the war French, Belgian, and Italian fishing trawlers, i.e., those regularly passing through warm waters, were equipped with refrigeration equipment to supplement their ice. Since the war, such equipment has become common in the Alaskan halibut fleet. But refrigeration has not caught on with the New England trawler fleet. This slow acceptance is probably because it is a customary practice to put the actual refrigeration equipment in a separate compartment, which cannot be readily installed on an old trawler without considerable expense. It also is due to remembrance of the failure of the mid-twenties' experiment without clear knowledge

of the reasons for that failure; and, most importantly, it is due to a clear realization that any equipment which will not drop the temperature of the fish well below freezing will result in too little gain in the quality of the fish caught in distant waters to warrant any substantial capital investment.

A more fundamental solution to the problem has been offered by the factory ship. Fish factory ships have long been very popular with all European nations and in Japan, but it is only since the last war that American factory ships have been launched. In general, they are equipped to take whole fish, separate and quick-freeze the edible portions, and then process the wastes into all of the conventional by-products which are produced ashore by the fish-processing industry. Not all of these factory ships need to obtain their fish from other boats; many of them are simply very large trawlers, equipped to process as well as to catch their own fish.



The one feature shared in common by all these factory ships is that the edible portions of the fish, either fillets or steaks, are quick-frozen at 0-10° F., and are not merely cooled to 32° F. Fish quick-frozen and held at temperatures below 10° F. can be stored for several months at sea, then for a substantial period in a freezer warehouse, and still reach the ultimate consumer in a state very closely resembling fresh fish. Not only does the factory ship permit the processing of fish of prime freshness with the retention of all its flavor and vitamins, but it also processes trash fish (those which are not edible) into fish meal, oil, and other by-products. In the old, conventional fishing operations, trash fish are thrown back into the sea.

The operation of factory ships brings us up squarely against the American fisheries' labor problem.[2] The essence of profitable operation for a factory ship is that the ship itself remain at sea for many months. Russian ships, for example, stay out for six-month periods or more. The Russian crews take their entire families with them, and school is regularly held aboard for their children. While this last feature is not found upon the factory ships of other nations, a factory ship usually remains away from its base for three months or more. American, particularly East Coast, fishermen generally will not stay away from their homes for any such lengths of time. In fact, they are reluctant to make the two-week voyages that some trawlers now need to complete their trips. Further, the requirement of the eight-hour day means that three full crews must be carried and American crewmen are allotted far more space per man aboard ship than are those of most other nations. In addition to the labor problem, the use of factory ships would compete directly with present land-based fish processing plants with possible severe economic losses to both operators and labor force. Since fish processing plants are operated by the fish distributors, the very people who would normally finance factory ships, there is little incentive for these people to put up the immense new capital now required for factory ships, while at the same time wiping out present investments. Yet these same fish distributors are suffering most acutely from the poor quality of the fish brought in by the present antiquated icing system.

In an attempt to overcome this dilemma, the Fisheries Technology section of the U. S. Fish and Wildlife Service has proposed a new process in which whole fish are fresh-frozen at sea and brought to port for processing by conventional methods. There are many virtues to this proposal. The whole fish is brought in fresh and all the viscera are available for the recovery of the valuable biological chemicals they contain. No alteration is required in the habits or mode of life of the fishermen. The capital investment required to install the necessary refrigeration equipment is relatively moderate. The larger of the present trawlers can be modernized to carry such equipment so that it is not necessary to build completely new ships. Obstructing these investments, however, is the possibility that installation of the equipment might seriously reduce the ship's capacity.

The technologists of the Boston laboratory of the Fish and Wildlife Service have pursued vigorously the goal of fresh-frozen fish. They have carried out extensive practical research to develop all the necessary technical information to make the process commercially practical. From the very inception of the work, their goal was to develop a process that would be specially suited to use in the New England trawler fleet.

The principles of this process have now been well established. Briefly, it has been proved that fresh-caught, whole fish, promptly deep-frozen, can be brought to shore, thawed, processed on conventional processing machinery, and yet yield a product which is in every way equal to that produced from freshly caught fish. Granting the technical success of this process, there are, of course, economic questions which must be answered. The most important of these is whether the improvement in the quality of fish reaching the consumer can be achieved without a substantial increase in price to offset the cost of installing and operating refrigeration equipment. The answer to at least part of this question lies in the fact that the poor and non-uniform quality of much of the fish products presently reaching the markets severely restricts their sale.

In the fishing industry there is less quality control than in any other branch of the food industry. If the raw materials reaching the fish processing plants are of variable but poor quality, there is nothing that the processors can do to upgrade the product. The only solution to this problem is to improve the quality of the raw fish brought in to the processor. None of the solutions proposed is as suitable to our New England industry's needs and calls for as little capital investment as does the freezing of whole fish at sea. Imported fish products are a threat at least partly because many of them now are of very high and consistent quality. This

[2] For a broad discussion of some of these problems, see a forthcoming book by Donald J. White, *The New England Fishing Industry* and *Monthly Review*, March 1950, "New England's Oldest Industry Faces Crisis."

phase of competition cannot be overcome by raising tariffs. It must be met by technological improvements. In this instance, government research has clearly anticipated the industry's needs. It only remains for the industry to have the courage and vision to apply this research.

Filleting Machines

In no branch of the fishing industry can so great a contrast be found between the old, inefficient, wasteful, unsanitary practices and the latest and most modern processes as in the handling of fish after they are brought to shore. At many fish piers the catch is speared and slung about with the old-fashioned three-tined fish fork. Every time a fish is speared, holes are made which become a source for possible bacterial infection and invariably result in the waste of good meat, because the section with the holes in it must be cut out and discarded. This practice of pitchforking is so undesirable that in countries such as Norway, where the fishing industry is very rigidly controlled by the Government, it is forbidden by law. In contrast with the pitchfork method, the Maine herring and California sardine canneries use suction pumps to unload the fish, automatic scales to weigh them, and maintain an almost completely mechanized and continuous operation.

The mechanical unloading, conveying, and weighing of fish are well-established and relatively simple processes. But the mechanical filleting of fish is a complicated and difficult affair. Fillets are strips of clear meat cut in a single continuous piece from each side of the fish starting at the backbone and going from the head almost to the tail. Since 1921 an ever-increasing proportion of fish has been sold in filleted form. With the spread of the frozen food industry, almost all frozen fish are sold in this form. These fillets are hand-cut by highly skilled fish cutters. Hand-cutting, no matter how skilled, is bound to result in non-uniform fillets. When the operation is hurried, a substantial amount of good meat is left on the fish carcass. Throughout the years many attempts have been made to develop a mechanical filleting machine. All other fish processing operations can be made automatic so that the filleting step alone prevents the development of completely continuous processes for the handling of the larger fish. Unfortunately, the fish themselves will not cooperate with the mechanical engineers. Not only do the fish of any one species vary greatly in size, but those of different species, such as cod, whiting, and redfish, have substantially different anatomies, with a different mode of attachment of the meat to the skeleton. Also, fish of different age and degree of freshness have flesh of varying firmness. A machine which would remove all the flesh, and nothing but the flesh, from a given size and species of fish, would slice into the bones in another size or species, and would leave half the meat on a third.

A Boston company has approached the problem with some success after twenty years' research and the expenditure of over a million dollars. The company abandoned the quest for a single machine which would fillet all species of fish, and concentrated on a series of similar machines each of which is designed to handle fish with a single type of skeletal structure. Thus one machine will fillet cod and haddock, a second will fillet whiting, a third redfish. Each type of machine will handle almost all the commercial sizes of fish in the particular species it is designed to handle.

The advantages of the filleting machine are that it increases the yield of usable flesh per fish by 10 to 18 per cent; the fillets produced are much more uniform and attractive than hand-cut fillets; the machines required to handle a given volume of fish occupy less space than is required for hand filleting, and plant and food sanitation is greatly simplified. Some labor savings are also possible per ton of fish processed, but the total number of workers involved is not substantially different from that involved in hand filleting although fewer of the workers need be highly skilled. It is to the credit of the unions that there has been no particular opposition to the introduction of these machines.

While filleting machines are extremely complicated, they are very sturdy and trouble-free in operation. One mechanic can service six or more machines. Any ordinary mechanic can be trained to do the work. Some idea of the ruggedness of the machines can be gathered from the fact that two of them, installed aboard the trawler *Ocean Life*, were successfully operated at sea in North Atlantic winter weather. Further proof of the efficiency of these machines can be adduced from the fact that both the First National Stores and the Great Atlantic and Pacific Tea Co. have been using cod and haddock machines continuously for the last six years. Such machines fillet 45 fish per minute, redfish machines cut up to 75 fish per minute, and whiting machines fillet up to 100 fish per minute. Filleting machines are now becoming standard equipment on all new foreign factory trawlers. Apparently it is only a matter of time until most fish fillets will be cut mechanically.

Conclusion

Major technological changes are converting the fisheries from primitive operations to those of modern industry. A very satisfying proportion of these improvements are products of New England ingenuity and perseverance, despite the fact that fisheries research in most other countries is backed by the government to an extent unknown here. When it comes to the application of these developments, however, we have little reason to be complacent. The record reveals instances when the shortsightedness of management, the timidity of capital, the unreasonableness of labor, and the indifference of government have prevented our fishing from developing into the important modern industry it could be.

Despite these handicaps, we can clearly see, here and there, the emergence of a modern industry; perhaps haltingly, possibly not yet secure, but showing promise of what is to come. Nature has been niggardly in giving New England metals, minerals, coal and oil, but we have been generously endowed with an extended coastline, good harbors, relatively short distances to good fishing grounds, and a know-how second to none. If properly developed, our fishing industry should yield us good returns. It should supply us not only with immense food supplies but also with new raw materials for our chemical industries. The opportunity is there. We possess the technological skill and know-how. Have we the daring to capitalize on the opportunity?

Monthly Review
FEDERAL RESERVE BANK OF BOSTON

Earnings and Expenses, N. E. Member Banks—1953

NET PROFITS of New England member banks reached new dollar highs in 1953, reflecting the records set by production, trade, and employment in the region and a consequent steady demand for credit from many sources. Net profits aggregated $41.3 million — ten per cent more than those reported in 1952. Boston banks reported an increase of 17 per cent in net profits, as charges on noncurrent transactions declined and net current earnings expanded. Banks outside Boston reported increases in net profits of only six per cent. The country banks experienced a smaller relative gain in net current earnings accompanied by an increase in noncurrent charges. Improvements in earnings and profits in general tended to be concentrated in the larger-sized banks throughout the district. On an annual basis net profits in the aggregate were 6.6 per cent of capital accounts — moderately exceeding the 1952 rate.

Total operating earnings reached $232 million — up slightly more than nine per cent from those in 1952. In Boston the rate of increase was ten per cent and at the outside banks close to nine per cent. Most of the increase was due to lending operations, but a larger total from charges and fees for other services also contributed. Earnings on loans accounted for 55 per cent of total earnings, a somewhat larger proportion than last year, reflecting the April increase to 3¼ per cent in the "prime" rate on commercial loans and upward adjustments in rates on other loans. Interest income from U. S. securities, although off ten per cent at Boston banks, increased slightly at the banks outside in comparison with 1952. The higher yields obtainable considerably limited the effect of lower average holdings of securities in Boston and more than offset the reduction at banks outside. Income from other securities increased at both groups of banks. Commissions and service charges earned through the banking departments rose moderately. Earnings from trust departments also improved.

Current operating expenses approached $145 million, an increase of almost eight per cent. Expenses again reflected heavier charges for salaries and other staff expenses. Both Boston and outside banks experienced about the same rate of increase. Interest payments on time and savings deposits moved higher at outside banks but were practically unchanged in Boston. Boston banks, in contrast to those outside, sustained heavier losses of savings deposits to other financial institutions which paid higher rates. Expenses did not rise as fast as total operating earnings, however, and a larger proportion of net current earnings was retained than last year. Net current earnings amounted to $87.4 million — up 12 per cent from those in 1952.

District banks again generally reported net losses on noncurrent transactions. Net losses and charge-offs on securities rose substantially at both Boston and outside banks. The increase reflected the lower bond prices which prevailed in the first half of 1953 and the policy followed by many banks of adjusting their investment portfolios to improve yields and effect tax saving on losses realized. Net losses and charge-offs on loans, transfers to valuation reserves for bad debts, and other loan losses were somewhat smaller than those in 1952. Boston banks reported smaller net charges.

Boston banks' profits before taxes increased 20 per cent and reached $33.5 million. At the outside banks, profits amounted to $42.6 million — up ten per cent for the year. Reflecting the increase in earnings, taxes on income rose 24 per cent in Boston and 15 per cent at banks outside — somewhat less than the rates of increase reported last year.

Cash dividends remained conservative but were moderately larger than in 1952. In Boston dividends paid were four per cent of total capital and at the banks outside 3.2 per cent. About $19 million of profits — 11 per cent more than last year — were retained to strengthen capital accounts.

MEMBER BANK EARNINGS, EXPENSES, AND PROFITS
(Amounts in Thousands of Dollars)

	Boston		Other First District Banks	
	Year 1953	% Change from Year Ago	Year 1953	% Change from Year Ago
Earnings:	**$81,357**	**+10.2**	**$150,886**	**+ 8.9**
Interest received on bonds and stocks	$16,735	− 5.2	$ 39,638	+ 2.9
Interest received on loans and discounts	45,300	+18.2	82,210	+12.2
Service charges on deposits	2,309	+ 6.4	10,508	+10.9
Trust department	8,510	+ 6.4	9,000	+ 8.0
All other income	8,503	+11.2	9,530	+ 6.6
Expenses:	**$45,501**	**+ 7.8**	**$ 99,338**	**+ 7.8**
Salaries and wages	$24,948	+ 6.8	$ 49,562	+ 8.2
Interest paid on time deposits	1,662	+ 1.8	14,271	+ 6.8
All other expenses	18,891	+ 9.6	35,505	+ 7.5
Net Current Earnings	**$35,856**	**+13.5**	**$ 51,548**	**+11.2**
Noncurrent Transactions	−$ 2,337	−36.7	−$ 8,867	+18.7
Profits before income taxes	$33,519	+20.2	$ 42,681	+ 9.7
Taxes on net income	16,276	+24.1	18,621	+15.0
Net Profits	**$17,243**	**+16.7**	**$ 24,060**	**+ 6.0**
Cash dividends on common stock	$10,242	+ 6.0	$ 12,079	+ 3.6

Changes in Principal Earning Assets

Lending volume at district banks reflected expanded commercial and industrial activity, large capital expenditures, and a high volume of residential building. Bank credit was also used to sustain and expand consumer spending. District banks financed consumers directly through personal instalment loans and indirectly through loans to sales finance companies and dealers. New credit required for defense needs again diminished. Total loans reached 40 per cent of deposits — the highest ratio in the postwar period. In general, district lending volume followed the national pattern.

Commercial Loans — Loans to business and industry remained high during the first half of the year — normally a period of declining loan volume. The expansive seasonal forces which usually characterize the second half of the year were much reduced and loans declined. During the first half of 1953, some firms borrowed in anticipation of future requirements and to supplement working capital, which had been reduced by the acceleration of corporate tax payments under the Mills plan. Sales finance and trade firms, which usually make net repayments in the first half-year, ex-

panded their borrowings to finance the high level of retail sales. Textile manufacturers increased indebtedness to build inventories, after a long inventory decline.

During the last half of the year, although borrowings by trade firms, food processors, and commodity dealers rose, repayments in most other lines were sufficiently large to push business loans at the year-end 1953 about three per cent below the level reached 12 months previously. Inventory cutbacks in some lines, the funding of some bank debt, and development of excess capacity in textiles principally explain the failure of business loans to expand in late 1953.

Real Estate Loans — Mortgage acquisitions of New England member banks continued to expand throughout 1953, but at a slower rate than in 1952. The relatively tight capital markets which existed in the first half of the year caused a shift in lenders' preferences from federally-aided to conventional types of home mortgages with higher down payments, shorter maturities, and higher interest rates. In early May, however, rates on VA and FHA mortgages were raised to 4½ per cent and, with the return of easier capital markets during the fall, these mortgages again became attractive.

Consumer Loans — Consumer instalment credit granted by district member banks continued to rise throughout 1953. Loans to purchase automobiles accounted for more than 67 per cent of the total increase of $92 million dollars. Sales credit for other durable goods also increased, but at a much slower rate.

Investments — Total investments of the banks declined during the first half of the year. The banks sold U.S. securities to obtain funds for loan expansion and to shift into state and municipal obligations offering higher yields and tax advantages. As business loans failed to expand in the second half of 1953, banks increased their investments chiefly by buying U.S. securities. At the year-end, total investments were only slightly under the levels at the end of 1952.

MEMBER BANK STATEMENT OF CONDITION
(Amounts in Thousands of Dollars)

	Boston		Other First District Banks	
	Dec. 31, 1953	% Change from Dec. 31, 1952	Dec. 31, 1953	% Change from Dec. 31, 1952
Total Assets	$2,737,712	− .7	$4,815,064	− .2
Total reserves, cash and balances	**$ 671,518**	**+ .9**	**$1,019,084**	**− 4.0**
Total investments	**$ 910,424**	**− 1.4**	**$2,035,601**	**− 4.6**
U. S. securities	768,636	− 1.6	1,652,648	− 6.0
Other securities	141,788	− .3	382,953	+ 1.9
Total loans and discounts	**$1,102,529**	**− .1**	**$1,690,220**	**+ 8.2**
Commercial and industrial loans	708,207	− 8.4	636,284	+ 4.0
Real estate loans	132,935	+21.0	507,137	+ 7.4
Other loans to individuals	195,829	+23.0	483,369	+15.0
All other loans	89,561	+ 7.0	88,276	+ 8.2
Reserve for bad debt losses, etc.	24,003	+ 7.2	24,846	+ 2.3
All other assets	**$ 53,241**	**−18.7**	**$ 70,159**	**+ 6.9**
Total Liabilities and Capital Accounts	$2,737,712	− .7	$4,815,064	− .2
Liabilities	**$2,486,463**	**− 1.1**	**$4,442,999**	**− .5**
Demand deposits	2,248,782	− .6	3,245,588	− .9
Time deposits	171,453	− 7.9	1,145,658	+ .1
All other liabilities	66,228	+ 2.2	51,753	+21.3
Capital Accounts	**$ 251,249**	**+ 2.8**	**$ 372,065**	**+ 3.4**

Money Market Developments

In response to the strong and rising business situation which characterized the early part of 1953, the Reserve System continued its policy of restraint of bank credit expansion by limiting the availability of member bank reserves. U.S. securities held under repurchase agreement by the System were sold back to the dealers in the first two weeks of January, extinguishing the reserves created when they were originally purchased. In mid-January the discount rates effective at the Reserve Banks were raised from 1¾ per cent to 2 per cent. From January through April, net sales of U. S. securities were made by the System Open Market Account. Member banks could obtain additional reserves only by discounting at the Reserve Banks.

The period was one of increasing credit demands, and the pressure placed on bank reserve positions was reflected in the high daily average level of discounting as the money markets became cumulatively tighter. Borrowing by member banks in this district as in the nation was heavy during the first five months of 1953. During May the average daily amount of discounts in New England aggregated over $50 million. The large cerdit demands across the nation, combined with reduced availability of reserve funds, contributed to a substantial and general rise in interest rates which affected all sections of the money market.

In May the System acted to relieve the pressure on member bank reserve positions and dispel the uncertainty prevailing in the money market, which had been intensified by the announcement of new Treasury cash needs in a market already hard pressed to supply private demands. During the following two-month period, over one billion dollars of U.S. securities were purchased for the System Open Market Account. Additional purchases were made during the balance of the year as need arose. The reduction in required reserves in early July also added a billion dollars to member bank reserve positions.

In response to these changes in the money market, borrowings at this bank — as in other districts — dropped sharply from the May average of $50 million to an average of $4 million in October. Averages of daily loans were only slightly higher in November and December. Over the summer and fall, banks regained much of their earlier losses in deposits. As loans leveled off excess reserves increased.

Markets were generally easier throughout the last half of the year. Repurchase contracts with U.S. security dealers, which had been used at appropriate periods throughout the year to relieve temporary pressures, were entered into in substantial volume to handle the special needs over the year-end. An active dealer market for securities was aided and the banks were provided additional reserves to meet seasonal demands. The easier credit policy found expression in money market rates. At the year-end, rates were generally lower or as low as those which prevailed a year ago. As the easier credit conditions continued into 1954, the Reserve Banks early in February reduced the discount rates from 2 per cent to 1¾ per cent, confirming the easier credit policy and aligning the discount rate with the lower market rates. During 1953 Federal Reserve policy ranged from restraint when the business situation was very strong to increasing ease as signs of some downturn in economic activity became evident.